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FLOOD INSURANCE STUDY
TOWN OF CRAIGSVILLE, VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Craigsville, Augusta County, Virginia, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Craigsville to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

This Flood Insurance Study was prepared by compiling pertinent information for the flood hazard areas in the Town of Craigsville from existing technical and/or scientific data originally prepared by others for purposes other than the National Flood Insurance Program (NFIP). This existing data was reviewed by FEMA prior to its use in the development of this Flood Insurance Study to ensure compliance with NFIP accuracy requirements.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the Soil Conservation Service during the course of the Flood Hazard Study for the Little Calfpasture River and Grassy Run in Augusta County. The Soil Conservation Service report was completed in June 1979.

1.3 Coordination

On October 10, 1984, the results of the study were reviewed at a final CCO meeting attended by representatives of FEMA and the Town of Craigsville.

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2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Craigsville, Augusta County, Virginia. The area of study is shown on the Vicinity Map (Figure 1).

Grassy Run, Taylor Hollow, Stuples Hollow, Sulphur Springs Hollow, and Staples Hollow were studied by detailed methods for their entire lengths within the corporate limits. The areas studied by detailed methods were selected based upon the extent and validity of available existing hydrologic and hydraulic data.

2.2 Community Description

The Town of Craigsville is located in the western corner of Augusta County in northern Virginia. It is completely surrounded by unincorporated areas of Augusta County.

The five streams studied by detailed methods are in the Little Calfpasture River drainage area, which comprises 54.8 square miles above the Augusta-Rockbridge county boundary. Grassy Run forms the southern border of Craigsville. Taylor Hollow flows south into Grassy Run. Stuples Hollow also flows south into Grassy Run, in the western portion of the town. Staples Hollow flows south and merges with Sulphur Springs Hollow before flowing into Grassy Run. The flood plains are all in urban or residential types of development except for several small brushy and wooded areas. Flood flows are restricted and diverted by numerous bridges and culverts.

Craigsville is situated in the Southern Appalachian Ridges and Valleys physiographic province. Soils are formed primarily from sandstone and shale. Some of the prominent soils are the Berks, Hazleton, and Craigsville series. Elevations range from approximately 1,400 feet to 3,000 feet (Reference 1).

The normal annual precipitation is approximately 40 inches, with a normal annual snowfall of 19 inches. The average January temperature is 34 degrees Fahrenheit (°F), and the average July temperature is 73°F (Reference 1).

2.3 Principal Flood Problems

Flooding on Grassy Run and its tributaries usually has resulted from intense thunderstorm activity. Excess rainfall concentrates quickly on the steep slopes; flood stages rise rapidly and fall just as quickly.

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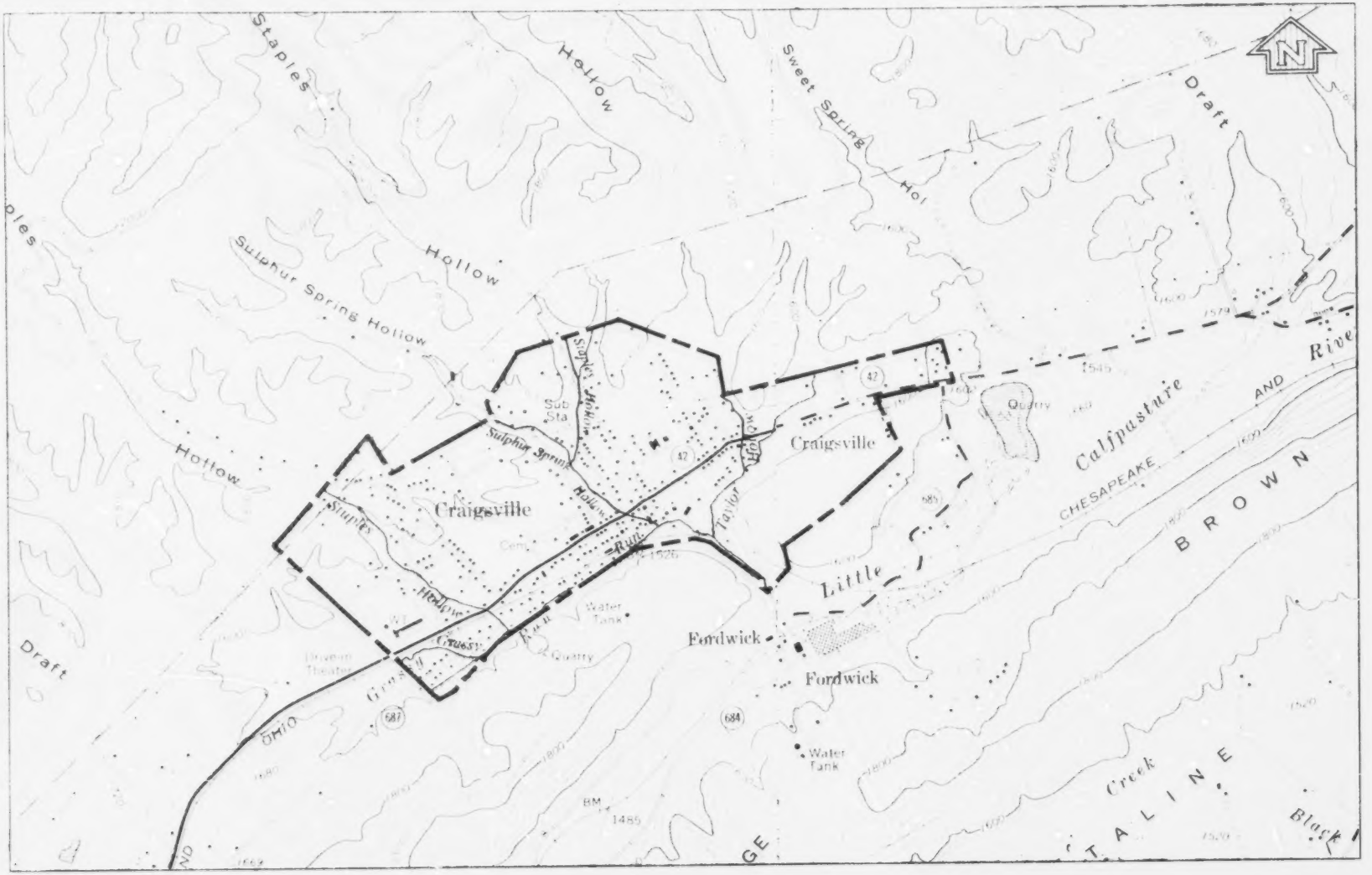

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

VICINITY MAP

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Flood damage to road fills, businesses, and other structures in the flood plains is generally slight to moderate. Long time residents indicated that floods have occurred from early spring to late fall, but in no predictable pattern as to frequency and season. No particular flood was remembered as being unusually severe (Reference 1).

2.4 Flood Protection Measures

Most bridge openings and channels have been enlarged or realigned so that flood plain depths of 3 feet would rarely be exceeded even during the most severe floods. Buildings that experienced repeated flooding have been removed or abandoned. Others in less hazardous locations have been partially floodproofed (Reference 1).

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

The hydrology was determined through a procedure involving assignments of values and land-use conditions of the drainage areas. Peak discharges for floods of the selected recurrence intervals were flood routed using the Soil Conservation Service (SCS) TR-20 computer program (Reference 2).

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This procedure involved routing the runoff from a 24-hour rainfall for the selected recurrence intervals as published in Technical Paper No. 40 (Reference 3). The computed data were checked for reliability from analyses of stream gage data in the general area, since none of the detailed study streams are gaged. The gage analyses followed the standard method outlined by Water Resources Council Bulletin 17A (Reference 4). Methods used to determine the hydrology for this study are outlined in the SCS National Engineering Handbook (Reference 5).

A summary of drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
GRASSY RUN					
At the Chesapeake and Ohio Railroad near the downstream corporate limits	7.9	1,750	3,050	3,750	5,600
TAYLOR HOLLOW					
At its confluence with Grassy Run	1.7	420	740	890	1,320
STUPLES HOLLOW					
At its confluence with Grassy Run	1.7	410	720	880	1,310
SULPHUR SPRINGS HOLLOW					
At its confluence with Grassy Run	1.6	410	720	890	1,310
STAPLES HOLLOW					
Approximately 1,000 feet upstream of its confluence with Sulphur Springs Hollow	0.9	220	385	470	720

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

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Water-surface elevations of floods of the selected recurrence intervals were computed using the SCS WSP-2 computer program (Reference 6). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for Grassy Run were determined assuming coincident peak flows with the Little Calfpasture River. Starting water-surface elevations for Taylor Hollow, Stuples Hollow, and Sulphur Springs Hollow were determined assuming coincident peak flows with Grassy Run. Starting water-surface elevations for Staples Hollow were determined assuming coincident peak flows with Sulphur Springs Hollow.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles are, therefore, considered valid only if hydraulic structures, in general, remain unobstructed and if channel and overbank conditions remain essentially the same as ascertained during this study.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year flood plain boundaries have been delineated using aerial photographs (Reference 7).

In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

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4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

No floodways were determined for the streams studied by detailed methods since there were no floodways determined for the streams in the report which this study is based on.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail in the Town of Craigsville.

5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:

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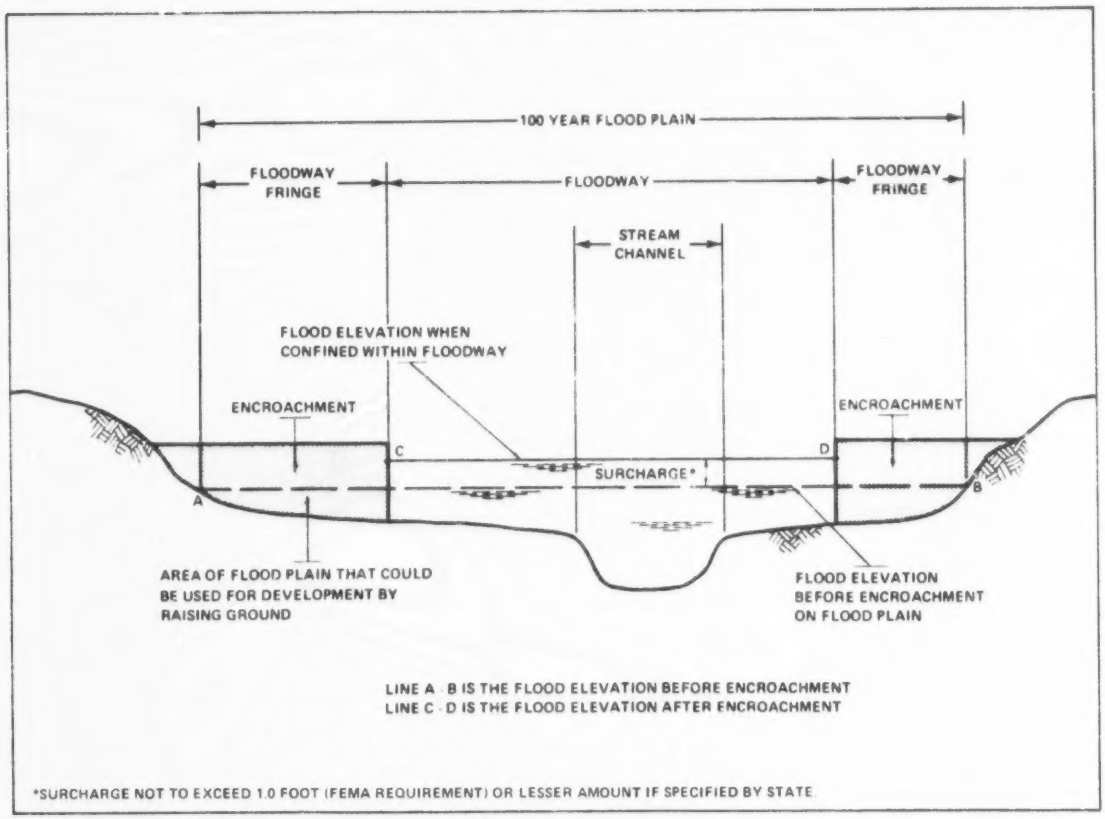
100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC Figure 2

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the Town of Craigsville are shown on the Flood Profiles (Exhibit 1) and summarized in Table 2.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Grassy Run Reach 1	01	-1.9	-0.7	+1.2	020	A4	Varies
Taylor Hollow Reach 1	01	-1.3	-0.4	+0.6	015	A3	Varies
Stuples Hollow Reach 1	01	-1.4	-0.5	+0.8	015	A3	Varies
Sulphur Springs Hollow Reach 1	01	-1.2	-0.5	+0.8	010	A2	Varies
Staples Hollow Reach 1	01	-1.1	-0.6	+1.1	010	A2	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

FLOOD INSURANCE ZONE DATA

GRASSY RUN – TAYLOR HOLLOW – STUPLES HOLLOW
SULPHUR SPRINGS HOLLOW – STAPLES HOLLOW

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The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zones A2, A3, and A4:	Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 2.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Craigsville is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

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6.0 OTHER STUDIES

This Flood Insurance Study was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared by other organizations originally for purposes other than the NFIP. The data was identified as the best available at the time of compilation of this Flood Insurance Study and should depict the general conditions of the flooding sources with relative accuracy. FEMA performed a cursory review and accepted the data as valid for purposes of this Flood Insurance Study and the NFIP. However, if better information is known to exist or has been developed since the date of this report, the information should be immediately forwarded to the Natural and Technological Hazards Division, Federal Emergency Management Agency (Regional Director, Region III Office, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106) for consideration for revision of this study.

A Flood Hazard Boundary Map has been published for the Town of Craigsville (Reference 8). The differences between the Flood Hazard Boundary Map and this study are justified due to the more detailed nature of this Flood Insurance Study.

The SCS published a Flood Hazard Study for the Little Calfpasture River and Grassy Run in Augusta County (Reference 1). This study is based on the data in that report.

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, Regional Director, Region III Office, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

8.0 BIBLIOGRAPHY AND REFERENCES

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8. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Town of Craigsville, Augusta County, Virginia, May 14, 1974, Revised May 28, 1976.

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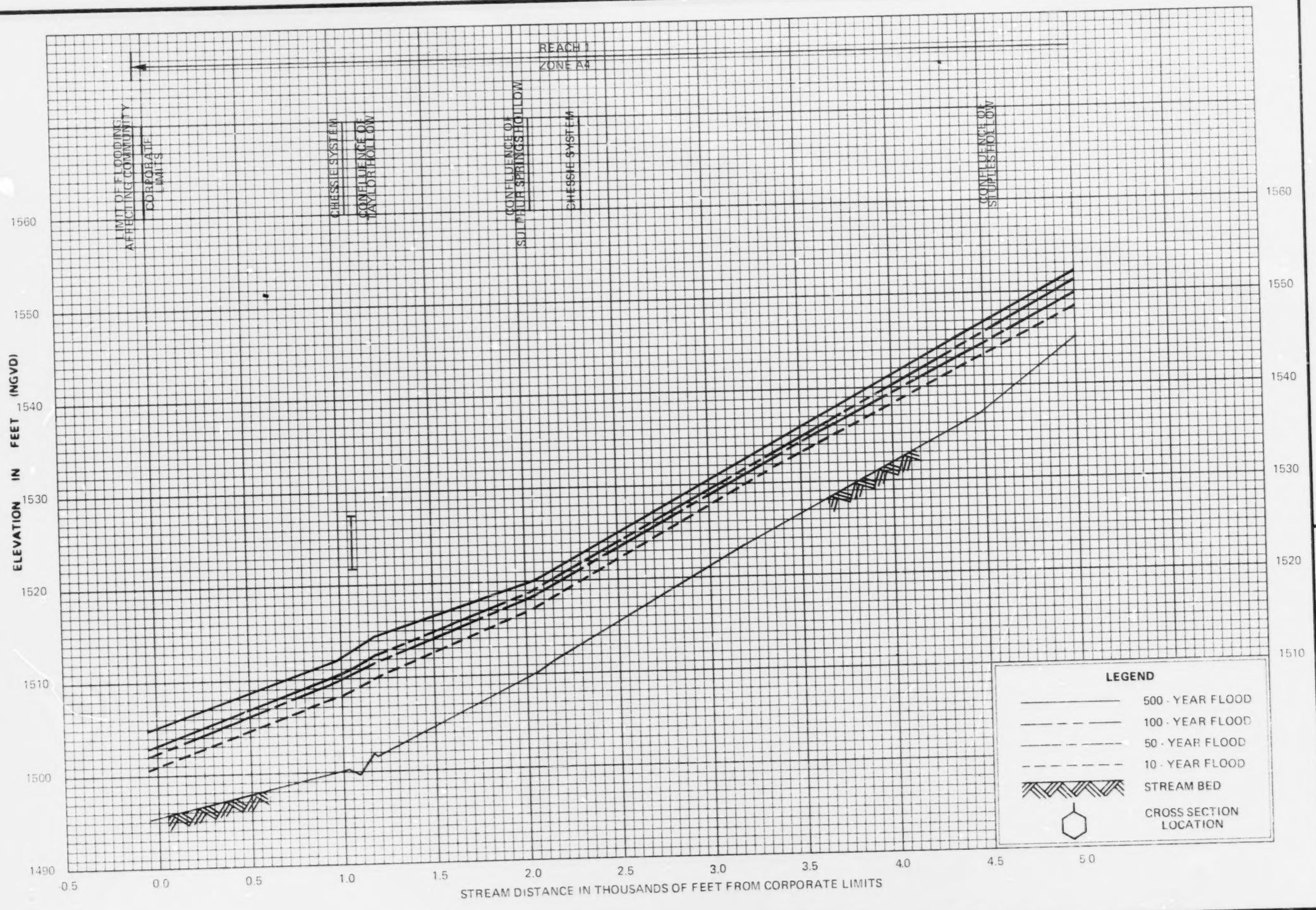

FLOOD PROFILES

GRASSY RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

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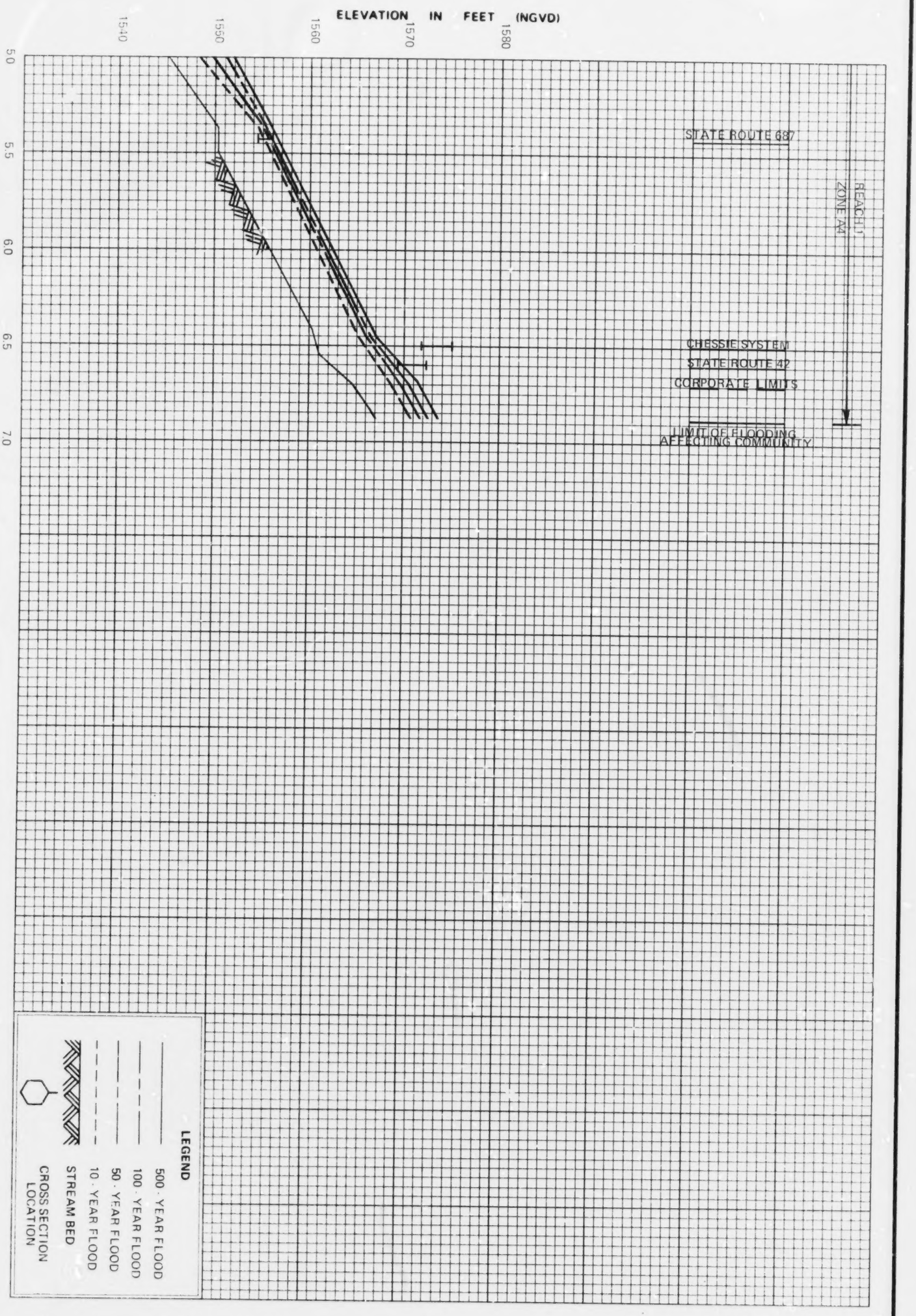

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FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

FLOOD PROFILES

GRASSY RUN

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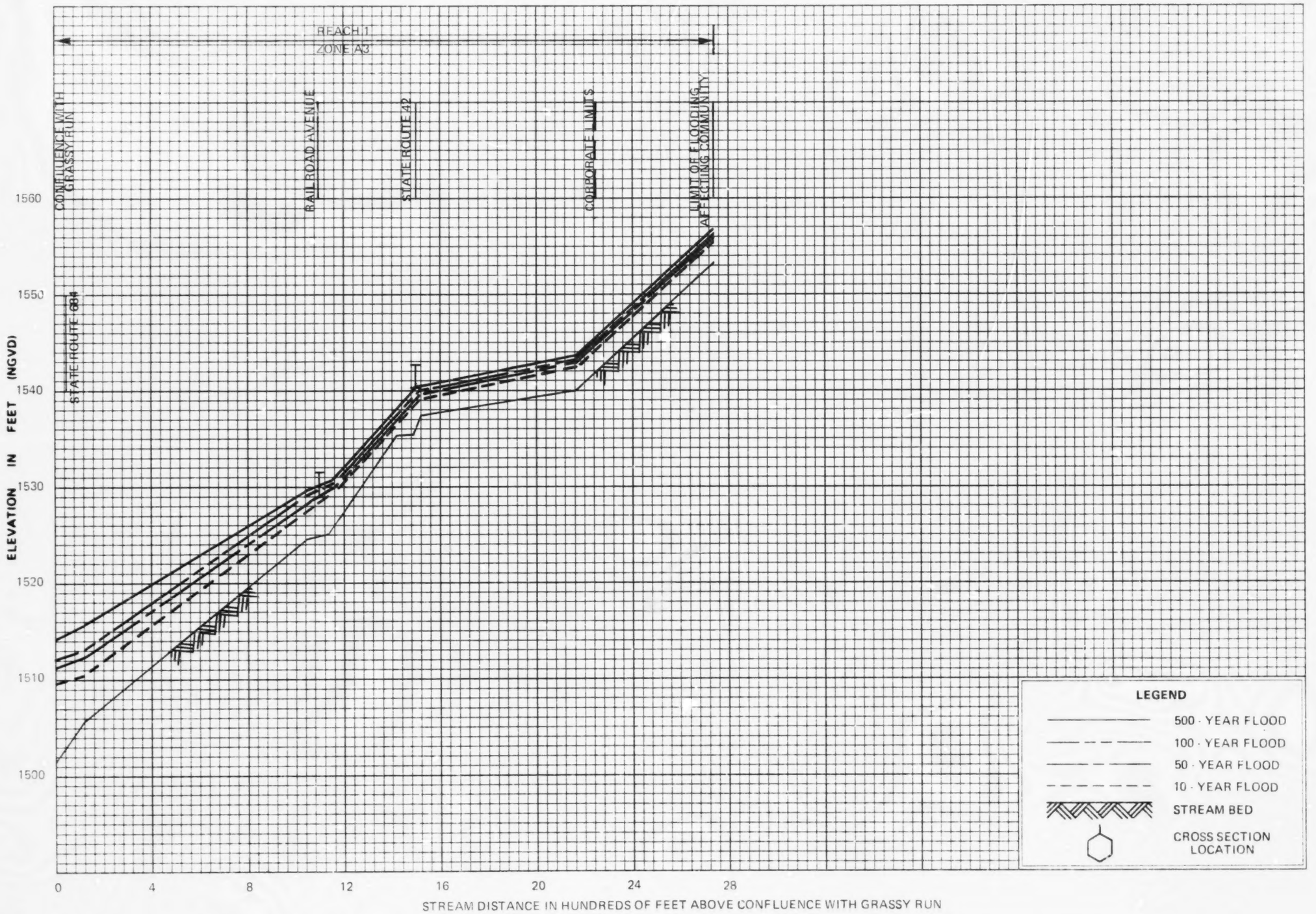

FLOOD PROFILES

TAYLOR HOLLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

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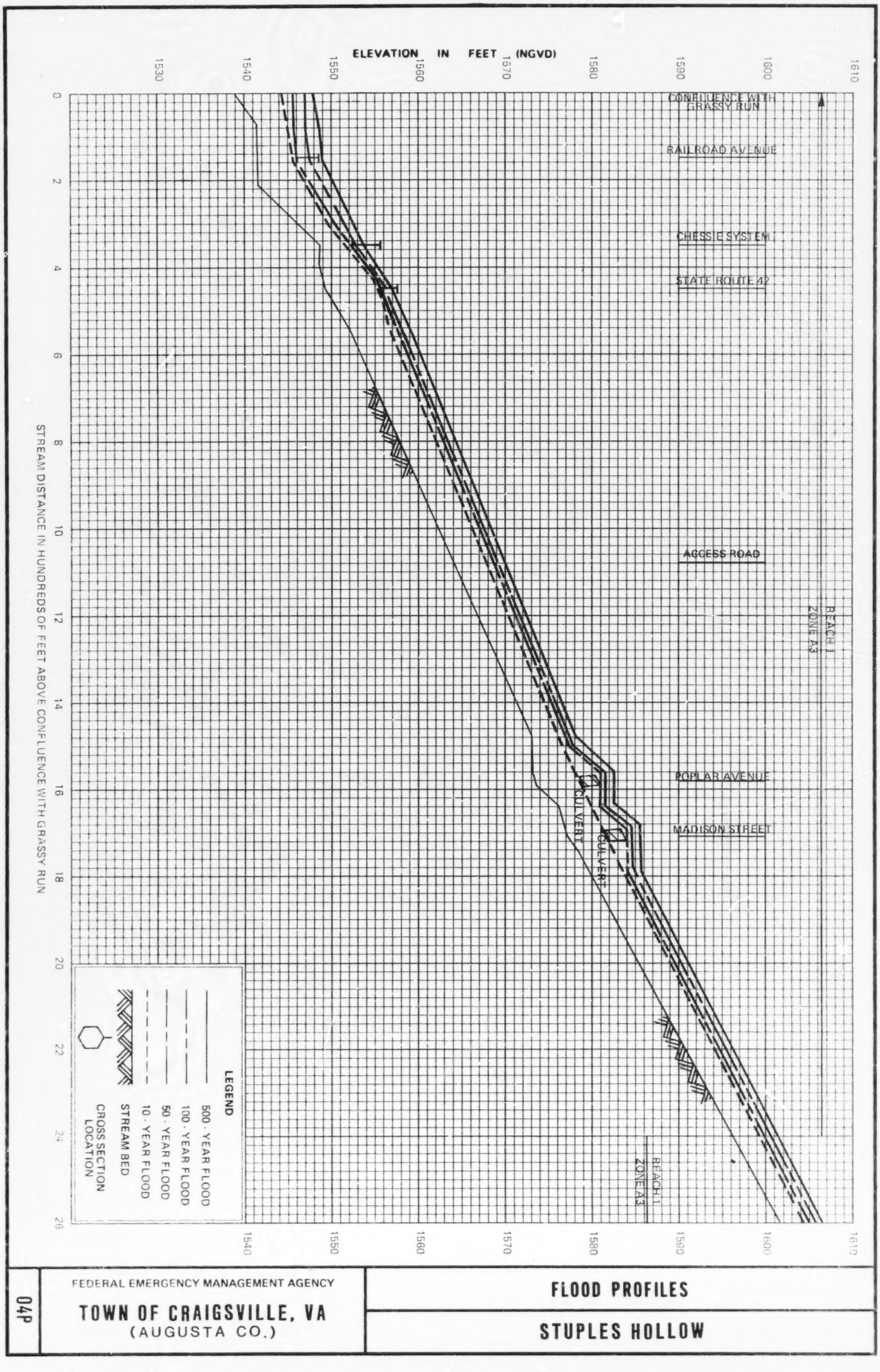

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

FLOOD PROFILES

STUPLES HOLLOW

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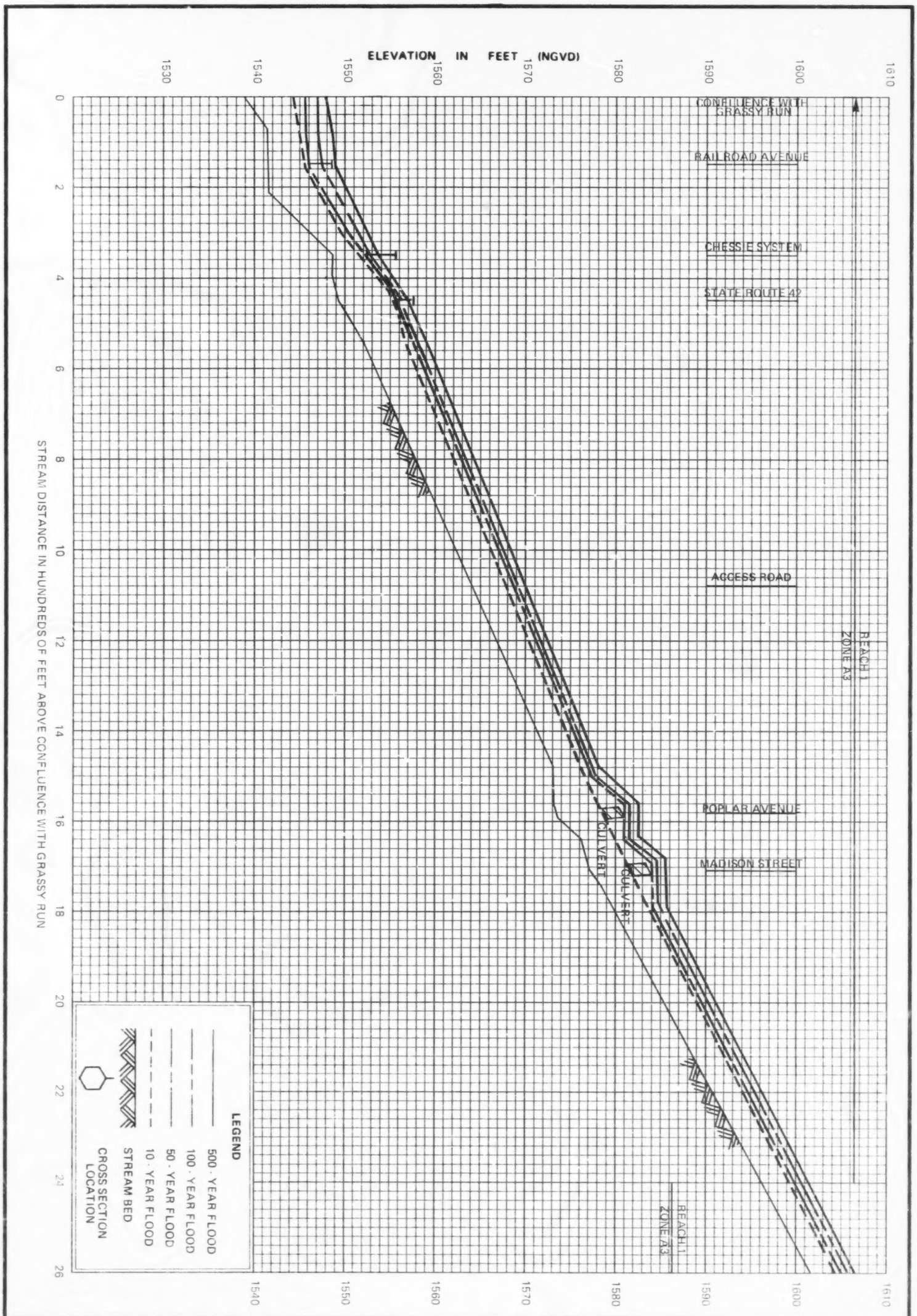

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

FLOOD PROFILES

STUPLES HOLLOW

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FLOOD PROFILES

STUPLES HOLLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

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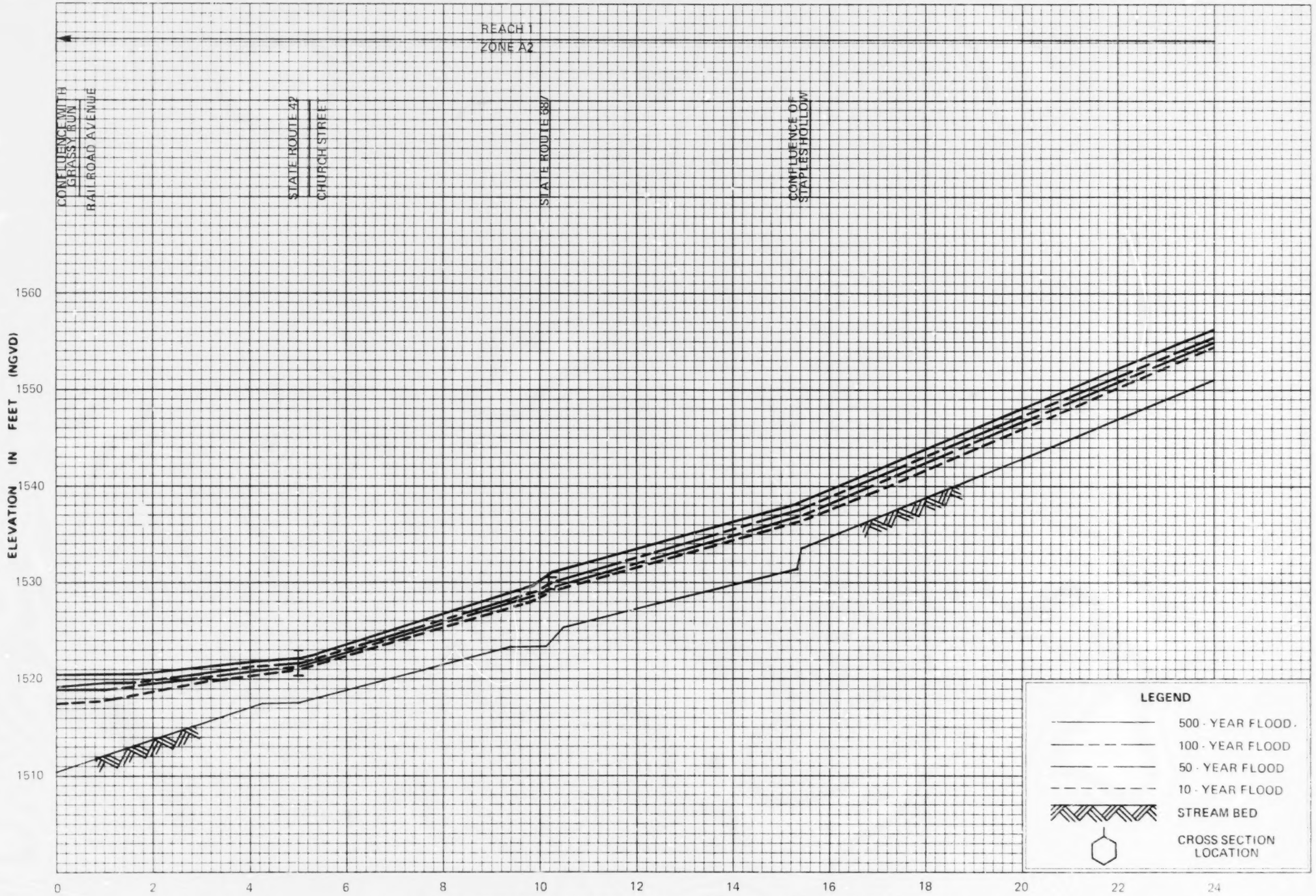

FLOOD PROFILES

SULPHUR SPRINGS HOLLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF CRAIGSVILLE, VA
(AUGUSTA CO.)

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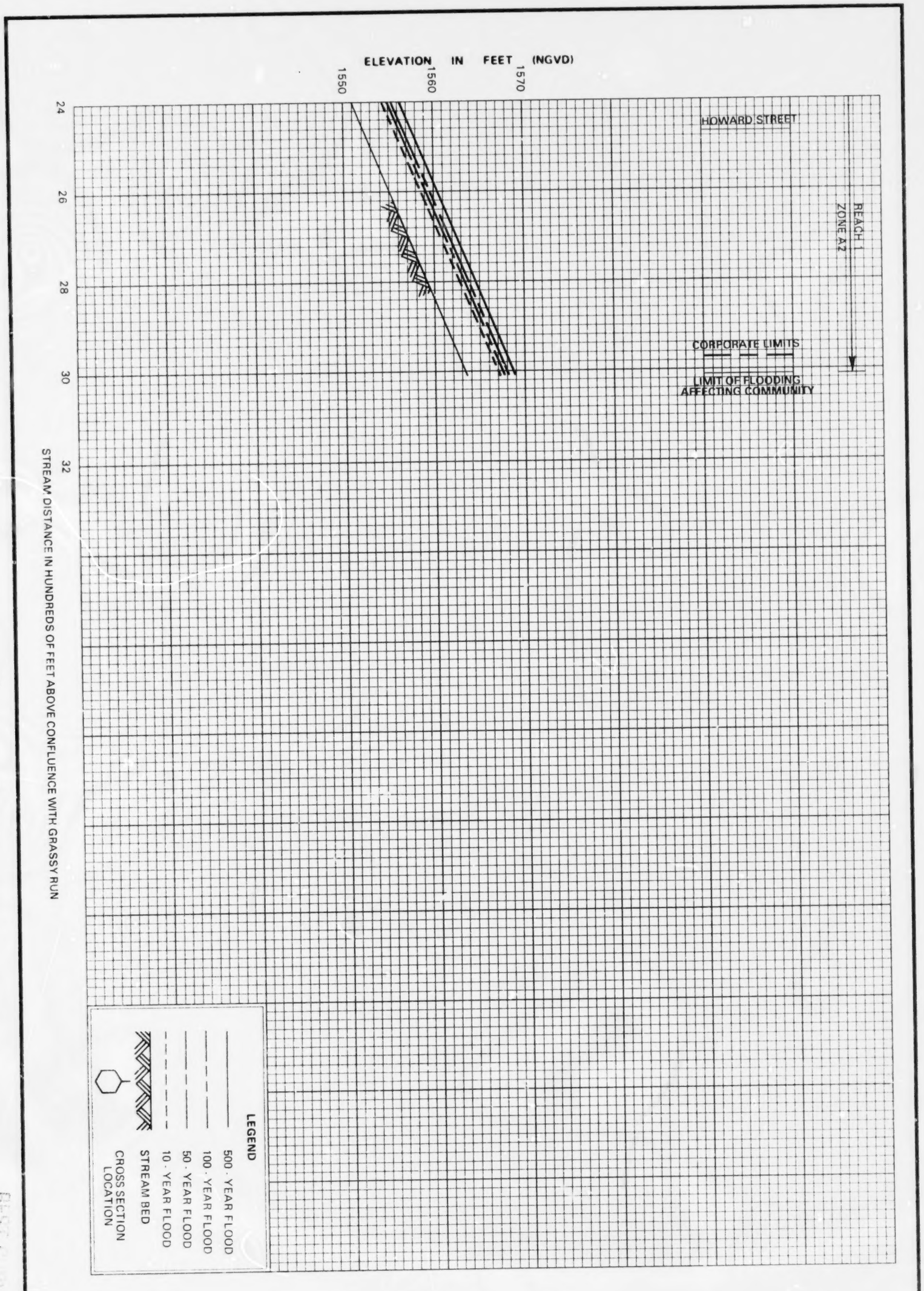

07P	FEDERAL EMERGENCY MANAGEMENT AGENCY TOWN OF CRAIGSVILLE, VA (AUGUSTA CO.)	FLOOD PROFILES SULPHUR SPRINGS HOLLOW

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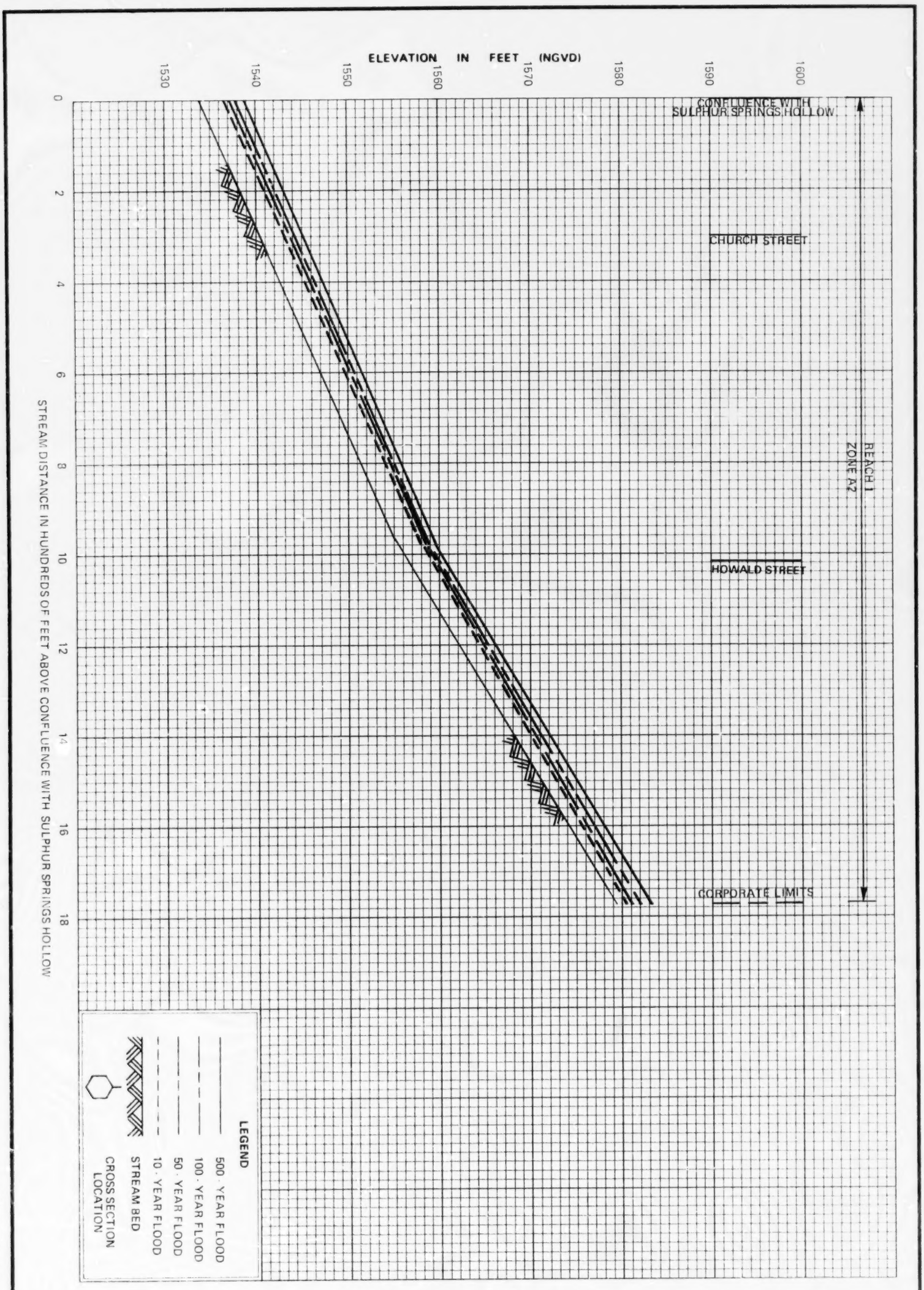

08P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TOWN OF CRAIGSVILLE, VA** (AUGUSTA CO.)	**FLOOD PROFILES** **STAPLES HOLLOW**

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